

Application Serial No. 09/499,229
Amendment dated October 27, 2004
Reply to Office Action mailed June 30, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) A solid-state imaging apparatus, comprising:

 a solid-state image sensor for accumulating information charges corresponding to an image of an object and generating an image signal in response to the information charges;

 a driver, connected to the image sensor, for driving the image sensor in accordance with a timing signal so that the information charges are accumulated in a predetermined exposure period, and for outputting the image signal from the image sensor;

 a first exposure information generating circuit for determining whether a level of the image signal output from the image sensor is within a predetermined range and producing first exposure information which is incremented or decremented based on the determination results;

 a second exposure information generating circuit for calculating second exposure information using the image signal output from the image sensor;

 a selection circuit, connected to the first and second exposure information generating circuit s, for selecting the first exposure information when the level of the image signal is outside of the predetermined range and selecting the second exposure information when the level of the image signal is within the predetermined range; and

 a timing control circuit, connected to the driver, for receiving the exposure information selected by the selection circuit and generating the timing signal therefrom in accordance with the selected exposure information, wherein the timing signal defines the predetermined exposure period.

2. (Original) The solid-state imaging apparatus of claim 1, wherein the predetermined range is defined by upper and lower limits, the first exposure information includes a first exposure period, and the first exposure information generating circuit compares the level of the image signal with the upper and lower limits, decreases the first exposure period by a predetermined unit when the level of the image signal exceeds the upper limit and increases the first exposure period by the predetermined unit when the level of the image signal is below the lower limit.

Application Serial No. 09/499,229
Amendment dated October 27, 2004
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3. (Original) The solid-state imaging apparatus of claim 2, wherein the second exposure information generating circuit receives exposure information selected from the selection circuit and calculates the second exposure information using a ratio of the selected exposure information to the level of the image signal and a reference value which corresponds to a reference exposure state.

4. (Original) The solid-state imaging apparatus of claim 1, wherein the first exposure information generating circuit further includes:

an exposure decision circuit for determining, every predetermined period, whether the level of the image signal output from the image sensor is within the predetermined range and generating a decision signal; and

an up/down counter, connected to the exposure decision circuit, for performing an up count operation or a down count operation in accordance with the decision signal, and generating the first exposure information.

5. (Original) The solid-state imaging apparatus of claim 4, wherein the second exposure information generating circuit includes a timing calculation circuit for receiving the exposure information selected by the selection circuit and calculating the second information which specifies an optimum exposure time using the selected exposure information and the image signal.

6. (Original) The solid-state imaging apparatus of claim 1, wherein the driver supplies a drain clock signal for draining the information charges stored in the image sensor and a transfer clock signal for transferring the stored information charges, and the timing control circuit supplies the driver with a second timing signal for producing the drain clock signal and the transfer clock signal according to the selected exposure information.

7. (Original) The solid-state imaging apparatus of claim 1, wherein the image sensor generates an image signal for one field during a vertical scan period and a plurality of horizontal scan periods, and the first exposure information generating circuit updates the first exposure information every vertical scan period.

Application Serial No. 09/499,229
Amendment dated October 27, 2004
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8. (Original) The solid-state imaging apparatus of claim 1, wherein the second exposure information includes optimum exposure time information.

9. (Currently amended) A method for controlling an exposure period of a solid-state imaging apparatus including a solid-state image sensor which accumulates information charges corresponding to an object image and generates an image signal in response to the information charges, comprising the steps of:

driving the solid-state image sensor in accordance with a timing signal so that the information charges are accumulated within the exposure period and the image signal is output;

determining whether a level of the image signal output from the solid-state image sensor is within a predetermined range and generating first exposure information which is incremented or decremented based on the determination results;

calculating second exposure information using the image signal output from the solid-state image sensory-selecting the first exposure information when the level of the image signal is outside of the predetermined range and selecting the second exposure information when the level of the image signal is within the predetermined range; and

generating the timing signal for setting the exposure period in accordance with the selected exposure information.

10. (Original) The method of claim 9, wherein the solid-state image sensor generates the image signal for one screen during a vertical scan period and a plurality of horizontal scan periods, and the step of generating the first exposure information includes updating the first exposure information every vertical scan period.

11. (Original) The method of claim 10, wherein the second exposure information includes optimum exposure time information.